FIG. 1

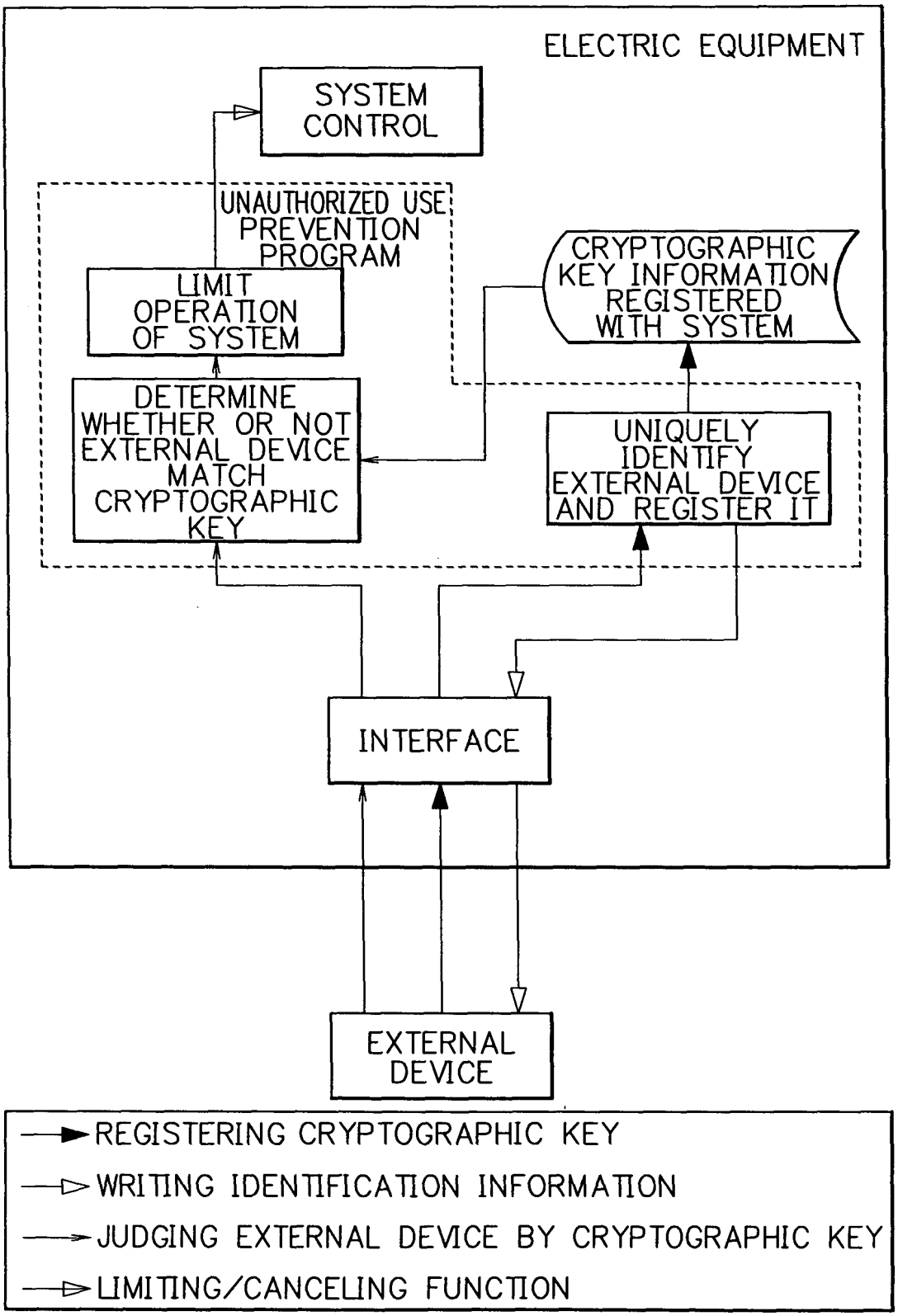

ELECTRIC EQUIPMENT
SYSTEM CONTROL
UNAUTHORIZED USE PREVENTION PROGRAM
LIMIT OPERATION OF SYSTEM
DETERMINE WHETHER OR NOT EXTERNAL DEVICE MATCH CRYPTOGRAPHIC KEY
CRYPTOGRAPHIC KEY INFORMATION REGISTERED WITH SYSTEM
UNIQUELY IDENTIFY EXTERNAL DEVICE AND REGISTER IT
INTERFACE
EXTERNAL DEVICE
REGISTERING CRYPTOGRAPHIC KEY
WRITING IDENTIFICATION INFORMATION
JUDGING EXTERNAL DEVICE BY CRYPTOGRAPHIC KEY
LIMITING/CANCELING FUNCTION

FIG. 2

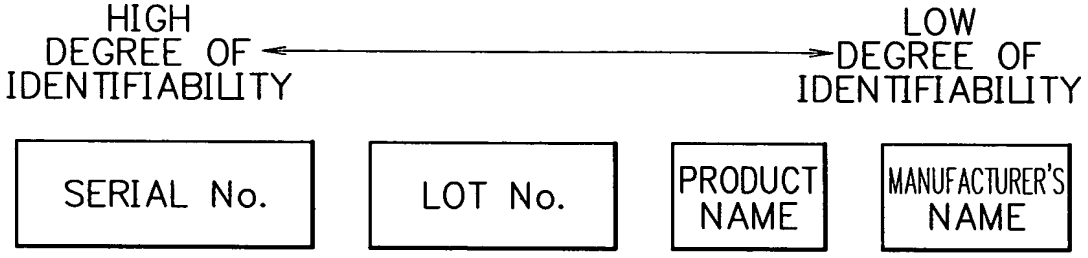

HIGH
DEGREE OF
IDENTIFIABILITY
LOW
DEGREE OF
IDENTIFIABILITY
SERIAL No.
LOT No.
PRODUCT NAME
MANUFACTURER'S NAME

FIG. 3

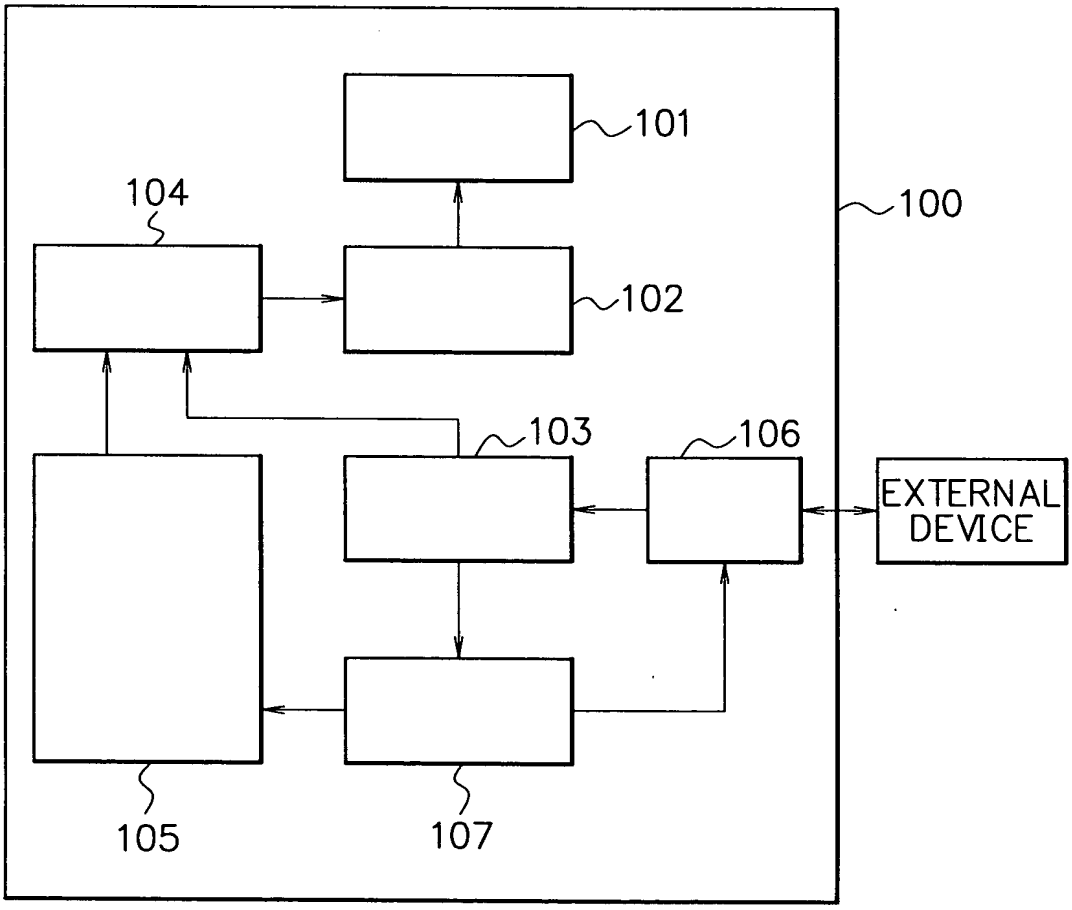

101
100
104
102
103
106
EXTERNAL DEVICE
105
107

FIG. 4

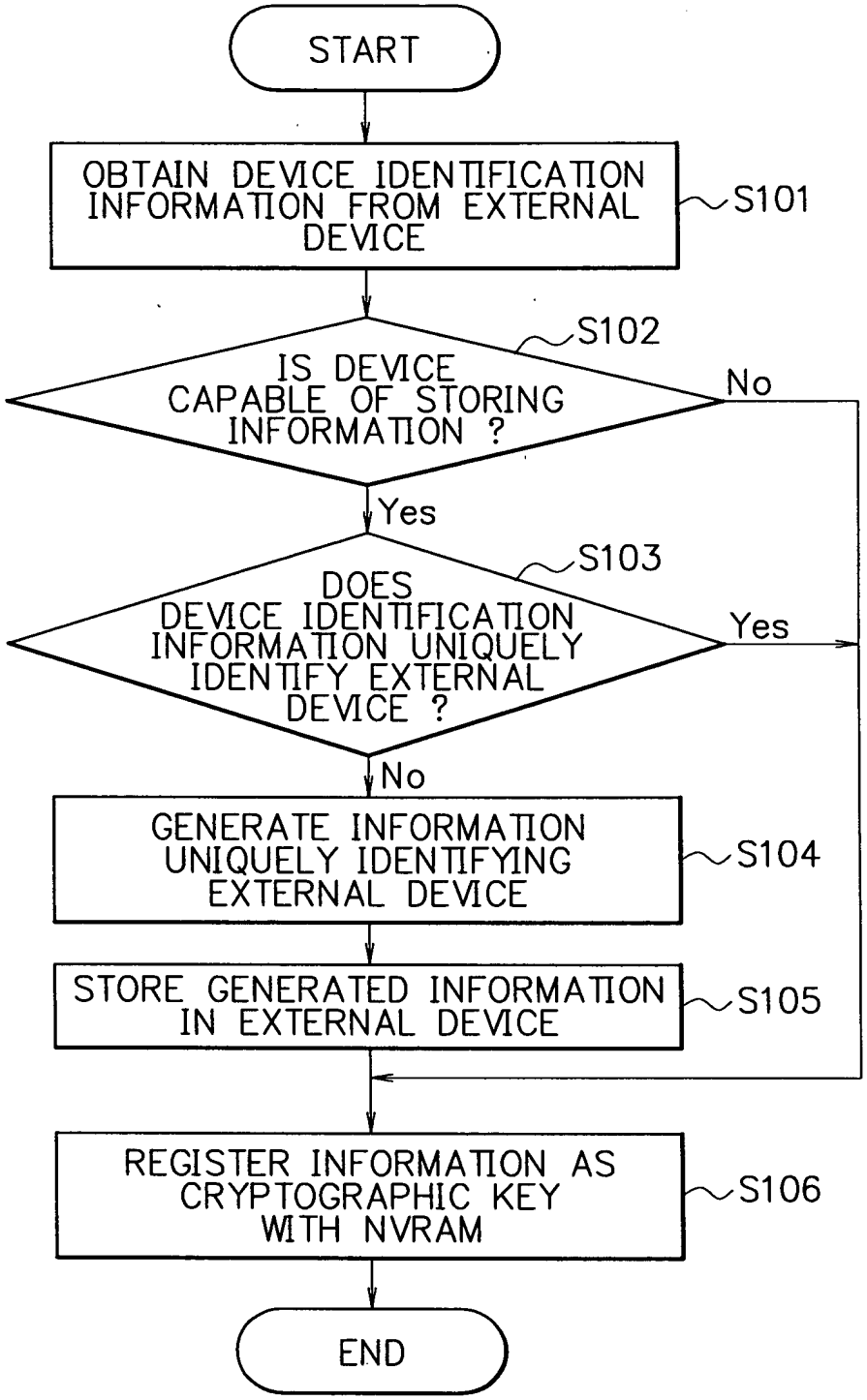

START
OBTAIN DEVICE IDENTIFICATION INFORMATION FROM EXTERNAL DEVICE
S101
IS DEVICE CAPABLE OF STORING INFORMATION ?
S102
No
Yes
DOES DEVICE IDENTIFICATION INFORMATION UNIQUELY IDENTIFY EXTERNAL DEVICE ?
S103
Yes
No
GENERATE INFORMATION UNIQUELY IDENTIFYING EXTERNAL DEVICE
S104
STORE GENERATED INFORMATION IN EXTERNAL DEVICE
S105
REGISTER INFORMATION AS CRYPTOGRAPHIC KEY WITH NVRAM
S106
END

FIG. 5

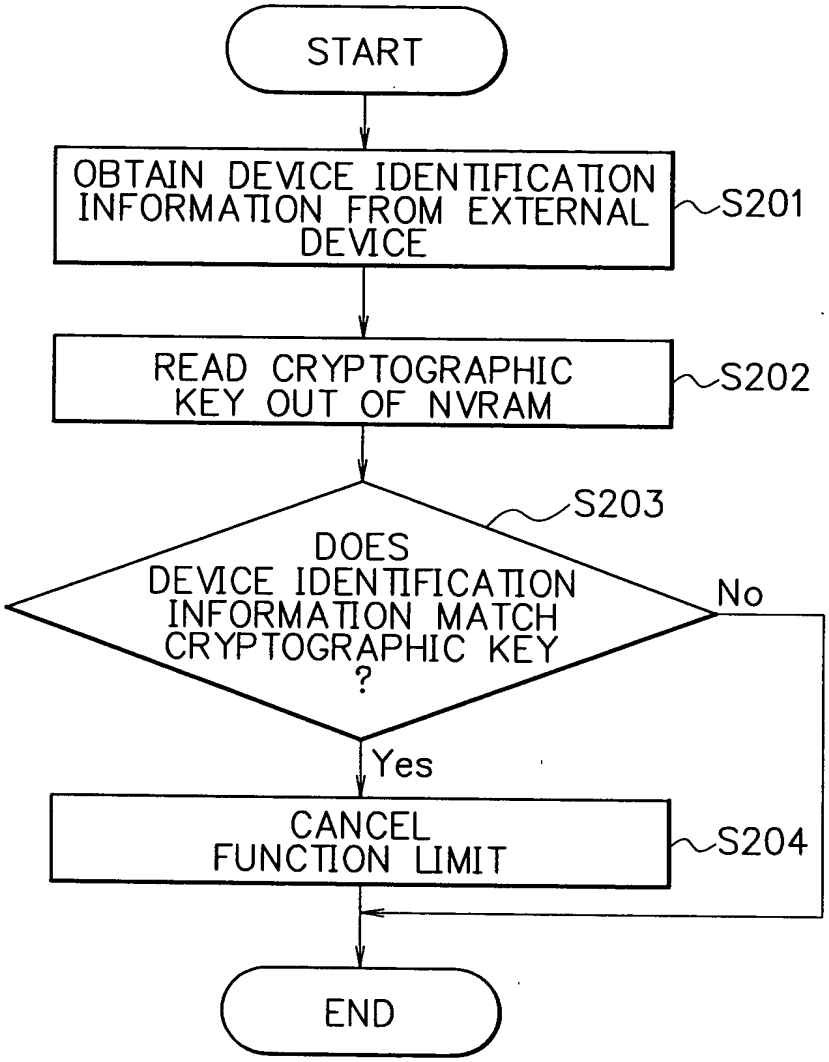

START
OBTAIN DEVICE IDENTIFICATION INFORMATION FROM EXTERNAL DEVICE
S201
READ CRYPTOGRAPHIC KEY OUT OF NVRAM
S202
S203
DOES DEVICE IDENTIFICATION INFORMATION MATCH CRYPTOGRAPHIC KEY ?
No
Yes
CANCEL FUNCTION LIMIT
S204
END

FIG. 6

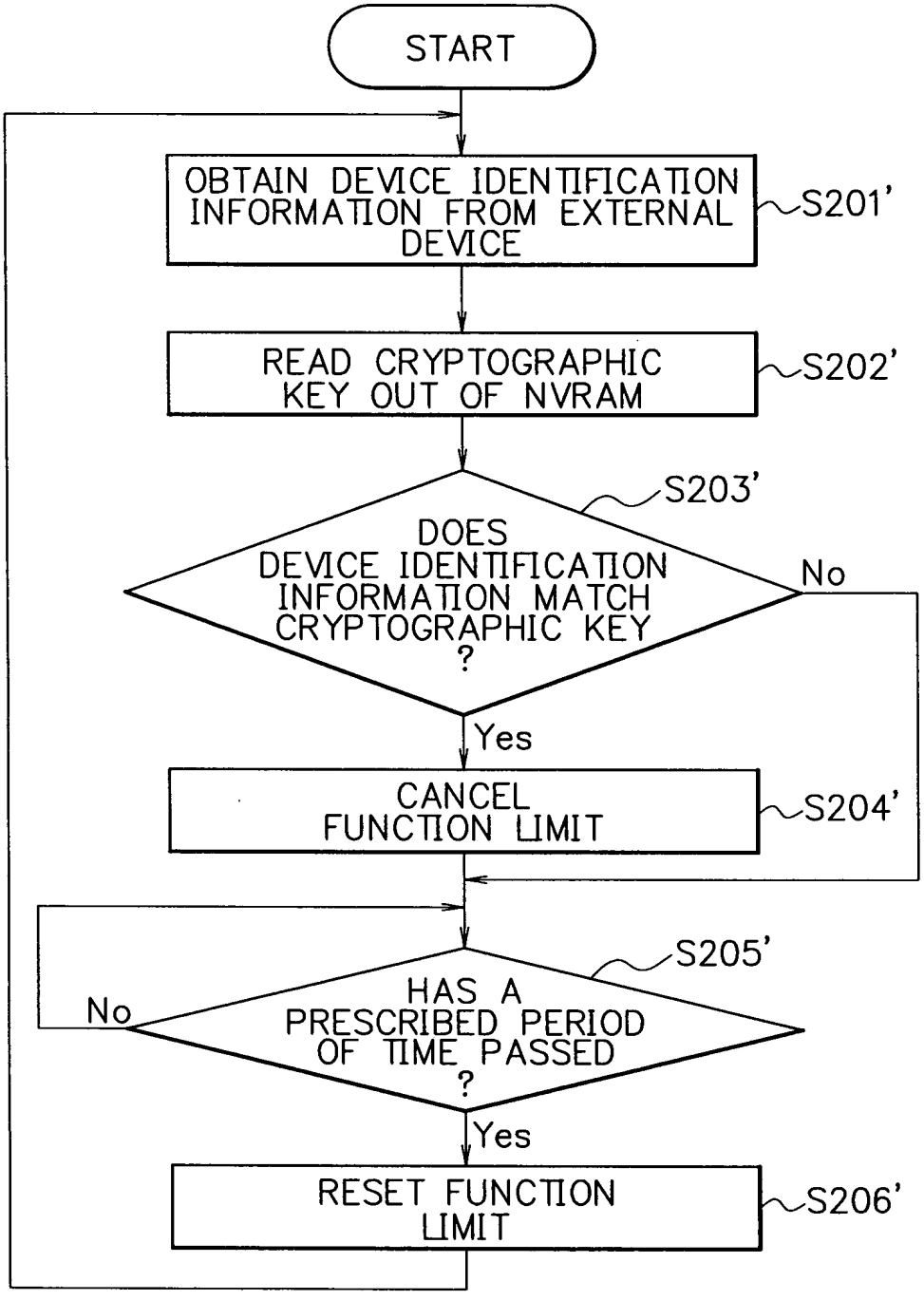

START
OBTAIN DEVICE IDENTIFICATION INFORMATION FROM EXTERNAL DEVICE
S201'
READ CRYPTOGRAPHIC KEY OUT OF NVRAM
S202'
S203'
DOES DEVICE IDENTIFICATION INFORMATION MATCH CRYPTOGRAPHIC KEY ?
No
Yes
CANCEL FUNCTION LIMIT
S204'
S205'
HAS A PRESCRIBED PERIOD OF TIME PASSED ?
No
Yes
RESET FUNCTION LIMIT
S206'

FIG. 7

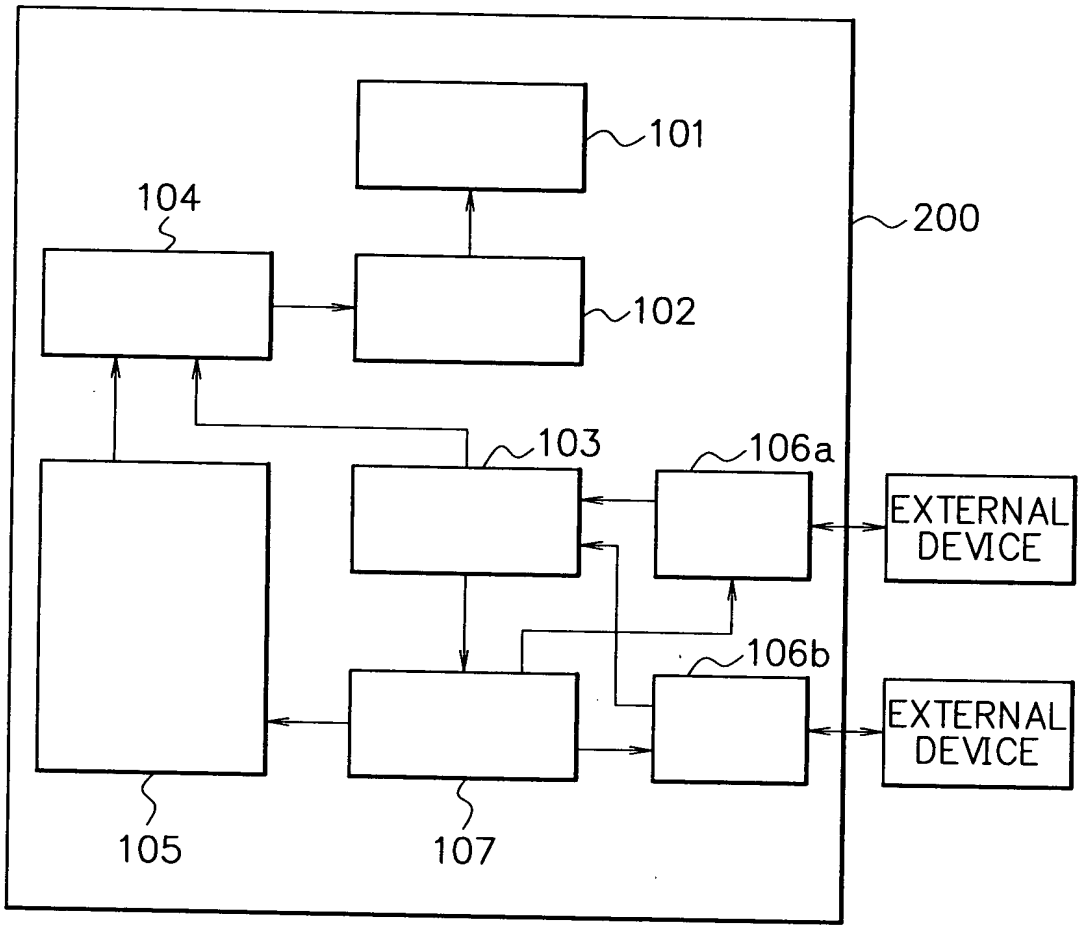

101
104
200
102
103
106a
EXTERNAL DEVICE
106b
EXTERNAL DEVICE
105
107

FIG. 8

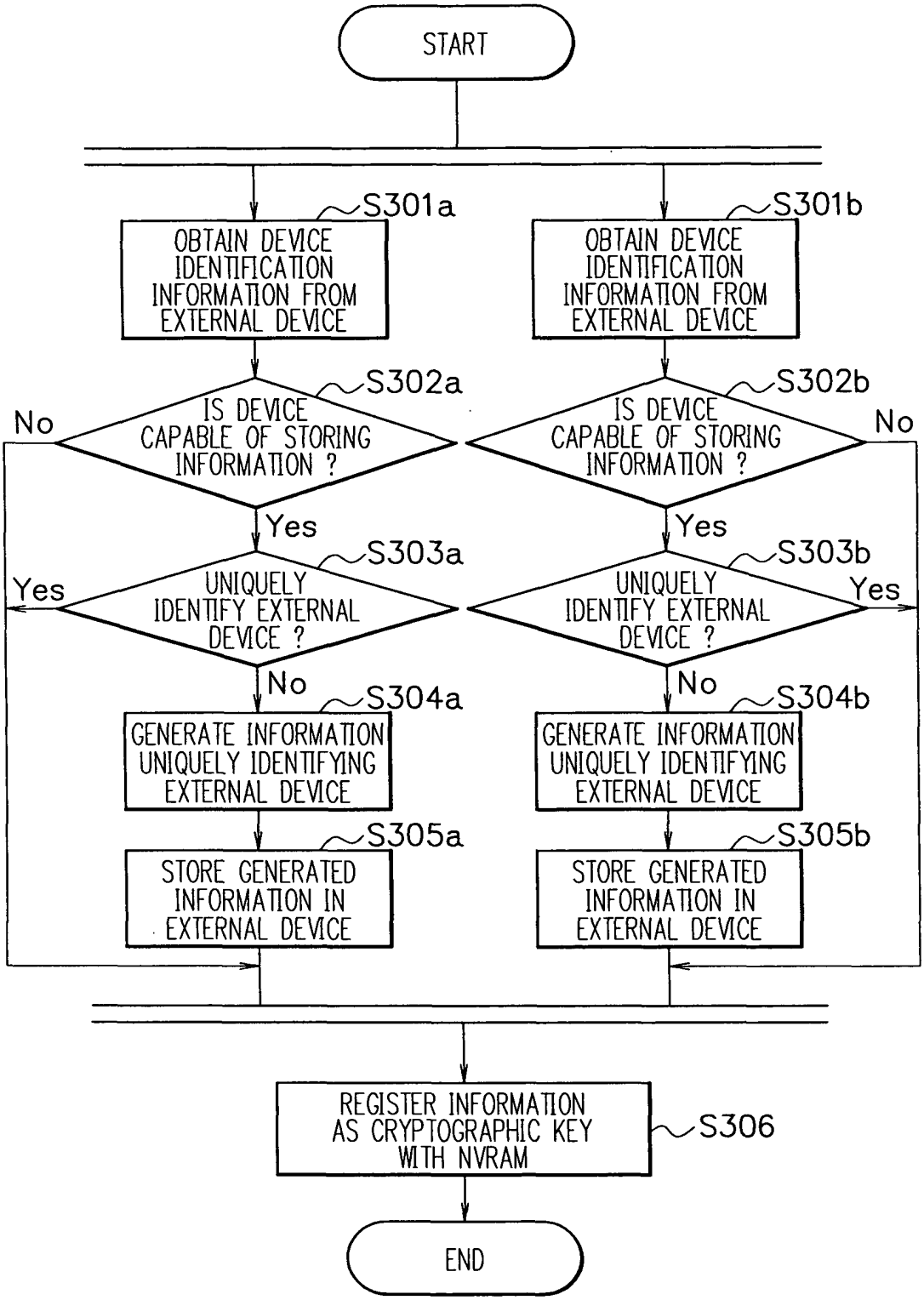

START
S301a
OBTAIN DEVICE IDENTIFICATION INFORMATION FROM EXTERNAL DEVICE
S301b
OBTAIN DEVICE IDENTIFICATION INFORMATION FROM EXTERNAL DEVICE
S302a
IS DEVICE CAPABLE OF STORING INFORMATION ?
No
Yes
S302b
IS DEVICE CAPABLE OF STORING INFORMATION ?
No
Yes
S303a
UNIQUELY IDENTIFY EXTERNAL DEVICE ?
Yes
No
S303b
UNIQUELY IDENTIFY EXTERNAL DEVICE ?
Yes
No
S304a
GENERATE INFORMATION UNIQUELY IDENTIFYING EXTERNAL DEVICE
S304b
GENERATE INFORMATION UNIQUELY IDENTIFYING EXTERNAL DEVICE
S305a
STORE GENERATED INFORMATION IN EXTERNAL DEVICE
S305b
STORE GENERATED INFORMATION IN EXTERNAL DEVICE
REGISTER INFORMATION AS CRYPTOGRAPHIC KEY WITH NVRAM
S306
END

FIG. 9

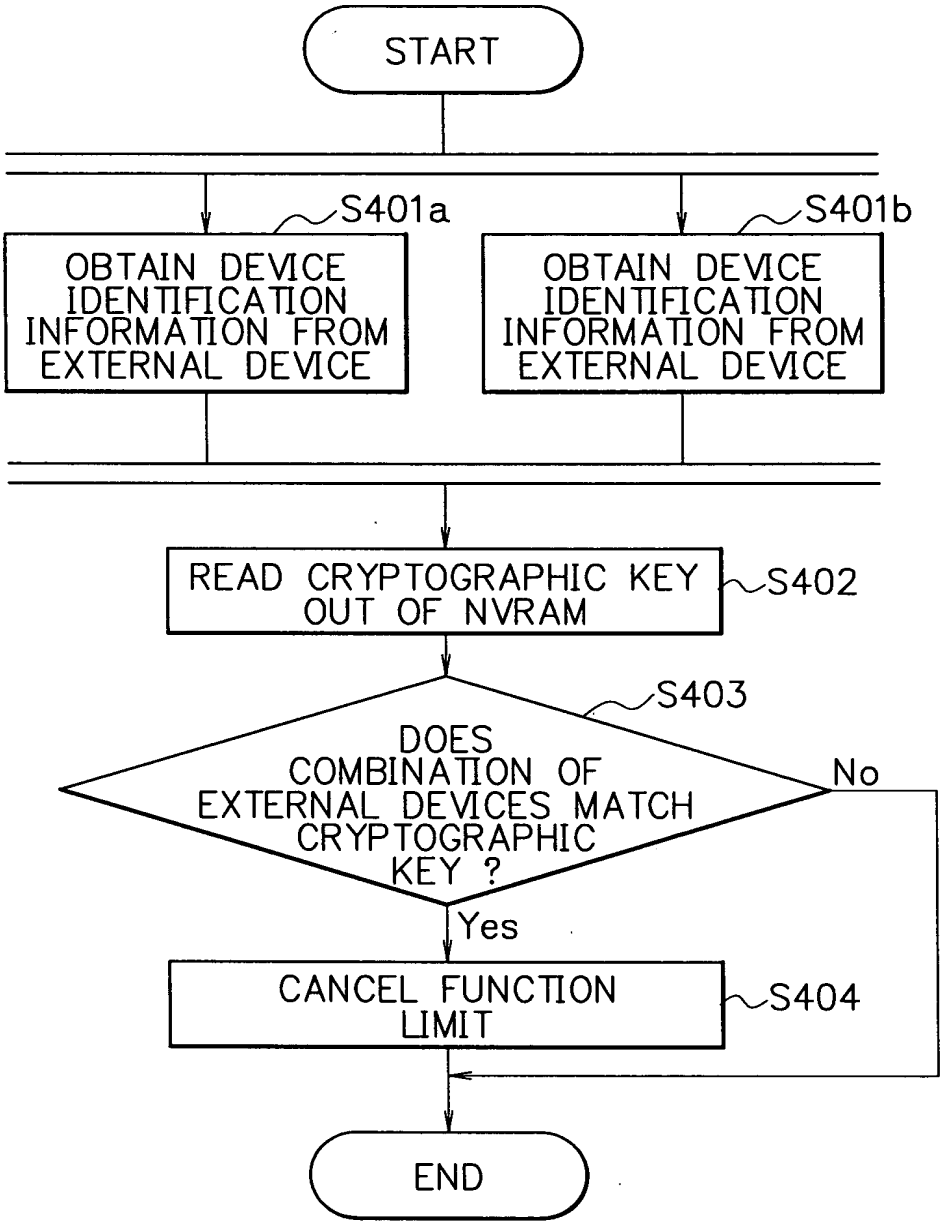

START
S401a
OBTAIN DEVICE IDENTIFICATION INFORMATION FROM EXTERNAL DEVICE
S401b
OBTAIN DEVICE IDENTIFICATION INFORMATION FROM EXTERNAL DEVICE
READ CRYPTOGRAPHIC KEY OUT OF NVRAM
S402
S403
DOES COMBINATION OF EXTERNAL DEVICES MATCH CRYPTOGRAPHIC KEY ?
No
Yes
CANCEL FUNCTION LIMIT
S404
END

FIG. 10

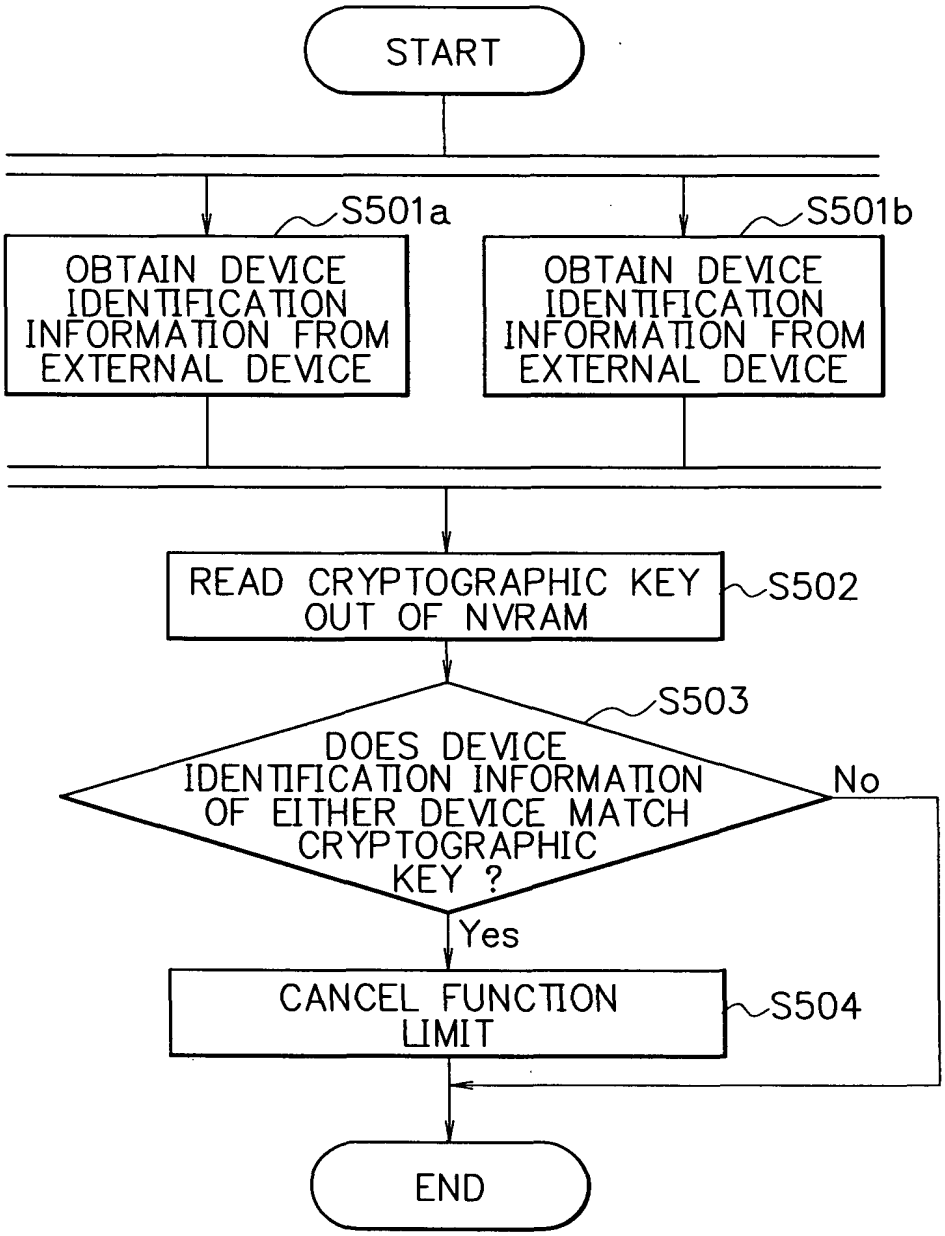

START
S501a
OBTAIN DEVICE IDENTIFICATION INFORMATION FROM EXTERNAL DEVICE
S501b
OBTAIN DEVICE IDENTIFICATION INFORMATION FROM EXTERNAL DEVICE
READ CRYPTOGRAPHIC KEY OUT OF NVRAM
S502
S503
DOES DEVICE IDENTIFICATION INFORMATION OF EITHER DEVICE MATCH CRYPTOGRAPHIC KEY ?
No
Yes
CANCEL FUNCTION LIMIT
S504
END

FIG. 11

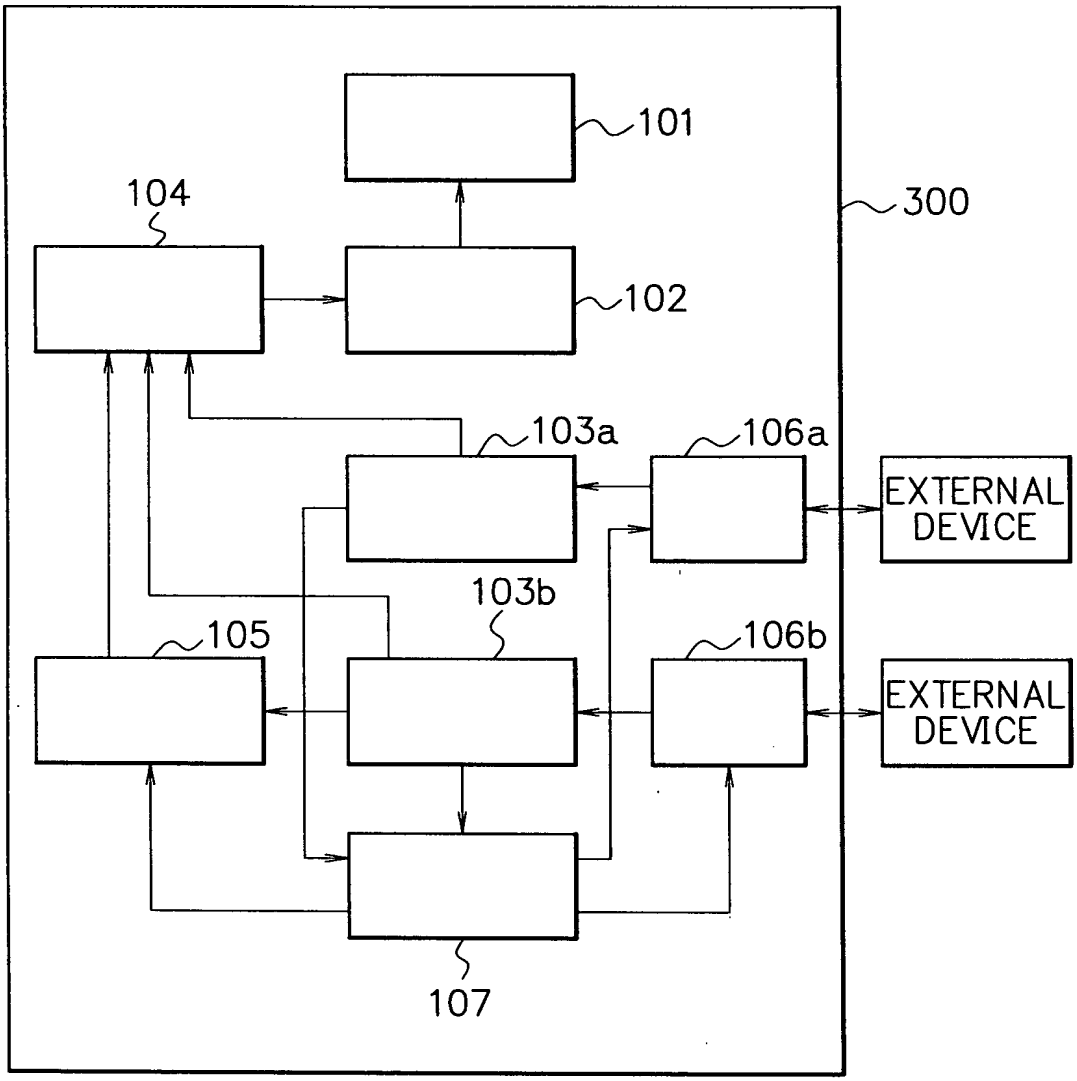

101
104
300
102
103a
106a
EXTERNAL DEVICE
103b
105
106b
EXTERNAL DEVICE
107

FIG. 12

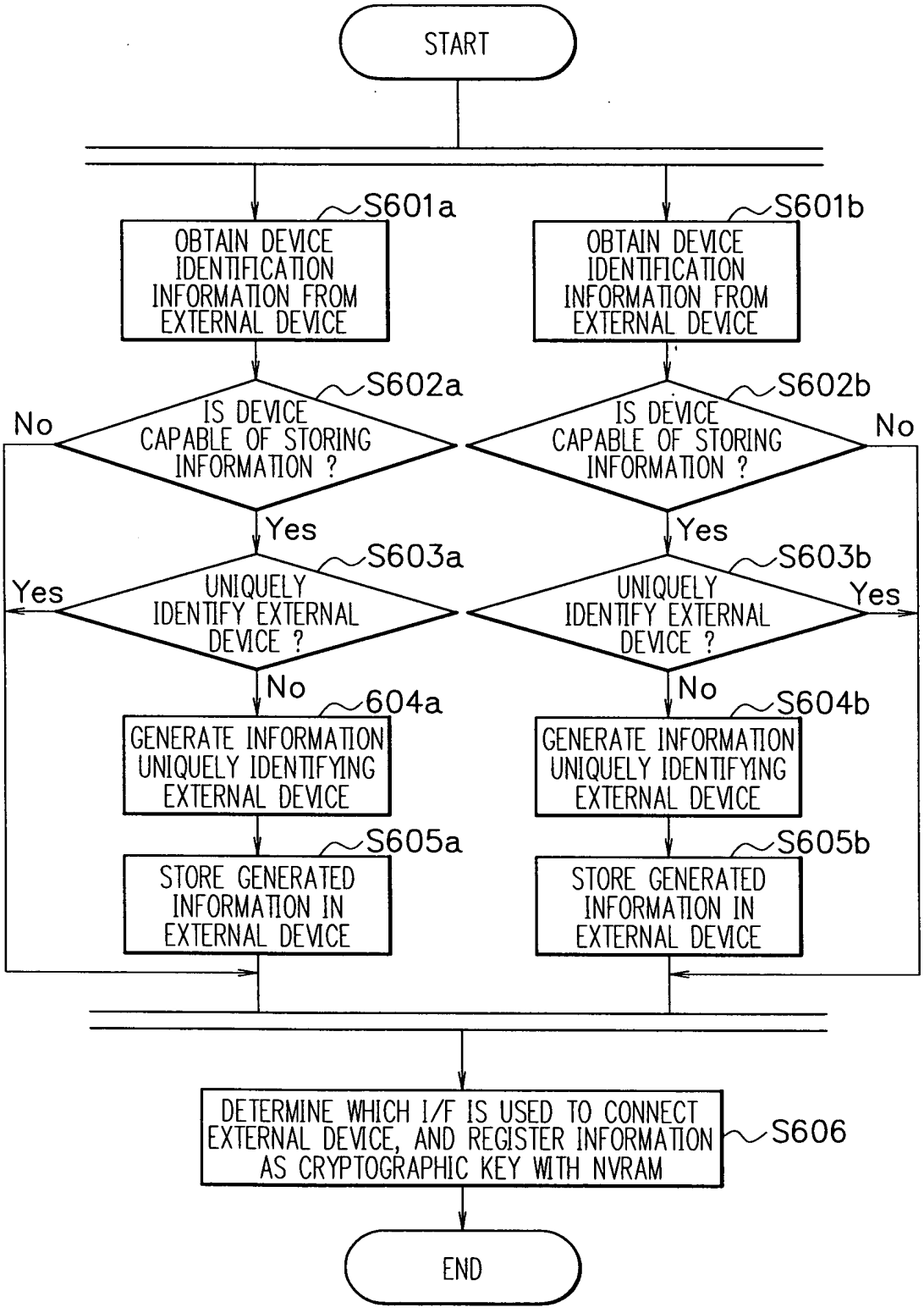

START
S601a
OBTAIN DEVICE IDENTIFICATION INFORMATION FROM EXTERNAL DEVICE
S601b
OBTAIN DEVICE IDENTIFICATION INFORMATION FROM EXTERNAL DEVICE
S602a
IS DEVICE CAPABLE OF STORING INFORMATION ?
No
Yes
S602b
IS DEVICE CAPABLE OF STORING INFORMATION ?
No
Yes
S603a
UNIQUELY IDENTIFY EXTERNAL DEVICE ?
Yes
No
S603b
UNIQUELY IDENTIFY EXTERNAL DEVICE ?
Yes
No
604a
GENERATE INFORMATION UNIQUELY IDENTIFYING EXTERNAL DEVICE
S604b
GENERATE INFORMATION UNIQUELY IDENTIFYING EXTERNAL DEVICE
S605a
STORE GENERATED INFORMATION IN EXTERNAL DEVICE
S605b
STORE GENERATED INFORMATION IN EXTERNAL DEVICE
DETERMINE WHICH I/F IS USED TO CONNECT EXTERNAL DEVICE, AND REGISTER INFORMATION AS CRYPTOGRAPHIC KEY WITH NVRAM
S606
END

FIG. 13

CRYPTOGRAPHIC KEY	
I/F	DEVICE IDENTIFICATION INFORMATION
A	C
B	D

FIG. 14

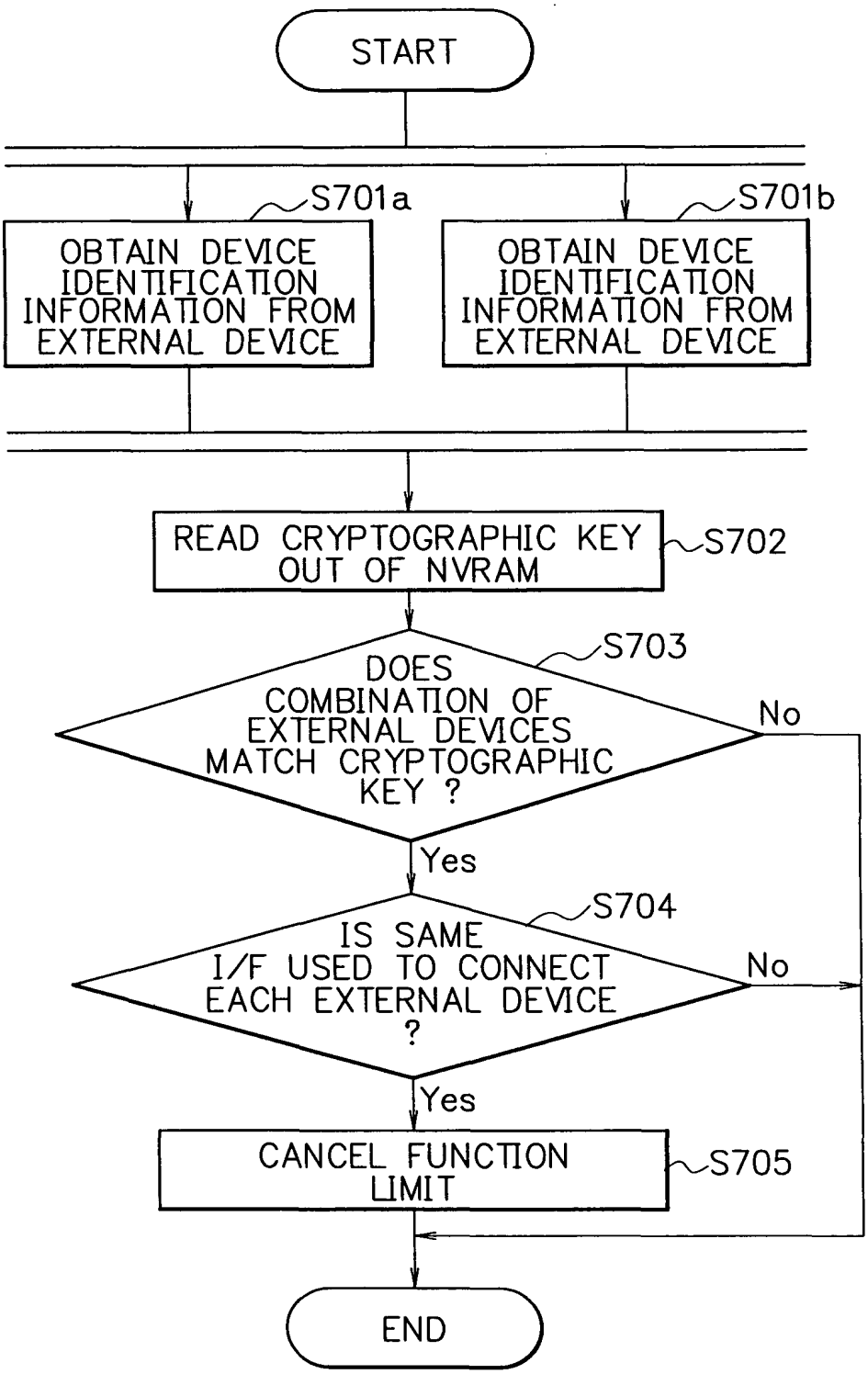
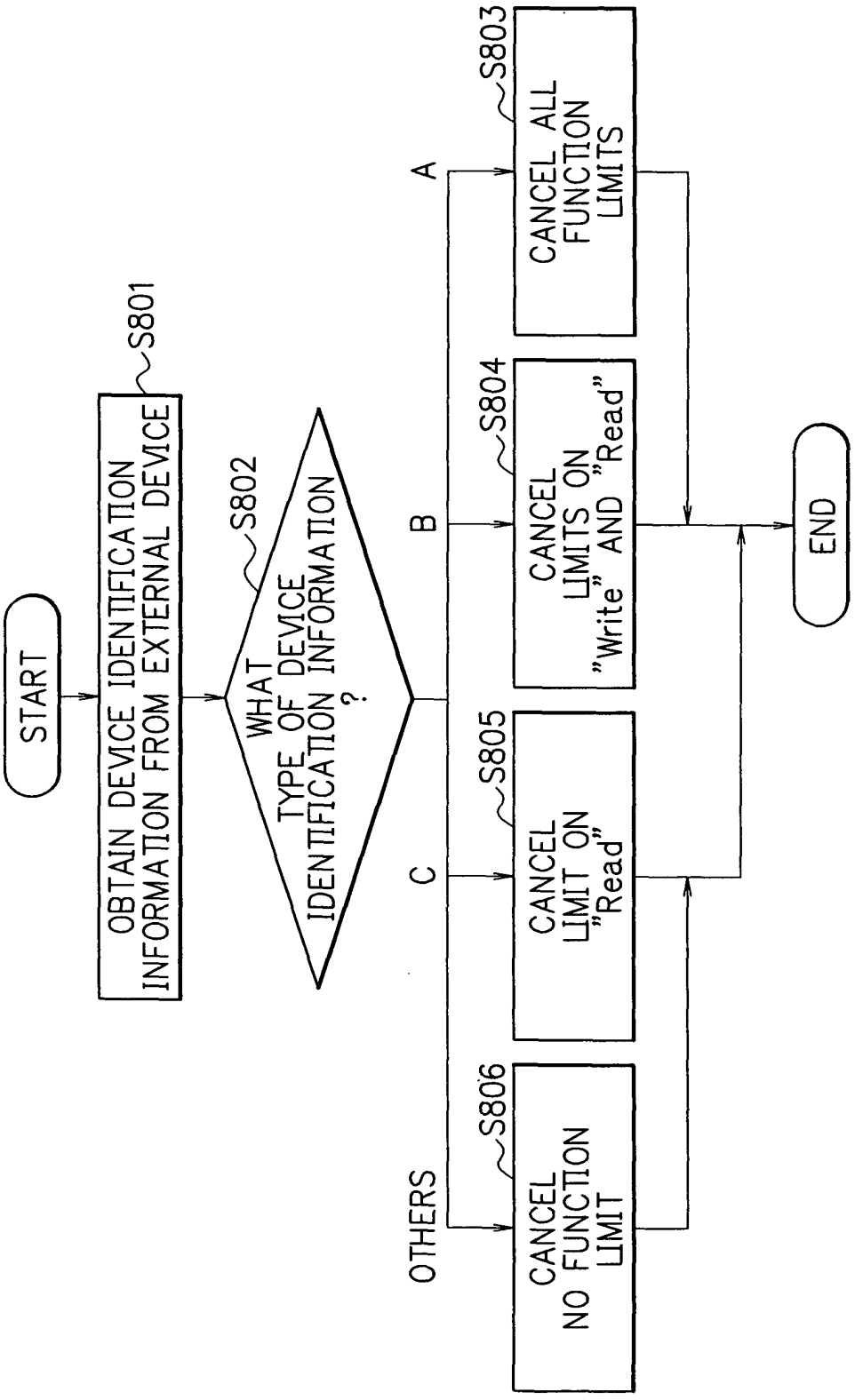

START
S701a
OBTAIN DEVICE IDENTIFICATION INFORMATION FROM EXTERNAL DEVICE
S701b
OBTAIN DEVICE IDENTIFICATION INFORMATION FROM EXTERNAL DEVICE
READ CRYPTOGRAPHIC KEY OUT OF NVRAM
S702
S703
DOES COMBINATION OF EXTERNAL DEVICES MATCH CRYPTOGRAPHIC KEY ?
No
Yes
S704
IS SAME I/F USED TO CONNECT EACH EXTERNAL DEVICE ?
No
Yes
CANCEL FUNCTION LIMIT
S705
END

FIG. 15

CRYPTOGRAPHIC KEY	AVAILABLE FUNCTION
A	All
B	Read, Write
C	Read
Default	Nothing

FIG. 16


START
OBTAIN DEVICE IDENTIFICATION INFORMATION FROM EXTERNAL DEVICE
S801
WHAT TYPE OF DEVICE IDENTIFICATION INFORMATION ?
S802
A
B
C
OTHERS
CANCEL ALL FUNCTION LIMITS
S803
CANCEL LIMITS ON "Write" AND "Read"
S804
CANCEL LIMIT ON "Read"
S805
CANCEL NO FUNCTION LIMIT
S806
END